Secret in the Hills

Cluster of Bunkers Holds the History of Caltech Rocket Fuel Project in WWII

By RENEE TAWA
TIMES STAFF WRITER

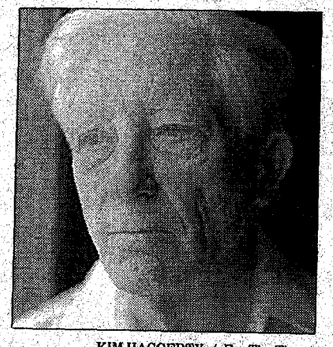
For 50 years, the foothills above Pasadena had kept the wartime secret, their overgrown oaks hiding the concrete bunkers, their canyons giving no clues of the days when they rumbled from rocket test firings.

And then in October, 1993, the foothills bared all.

A wildfire swept through the hillsides above Eaton Canyon, exposing a long-forgotten piece of World War II history: five concrete storage bunkers that had been covered by thick chaparral, scrub oak and sycamore.

During the war, Caltech stored more than 500,000 pounds of rocket fuel in the bunkers as part of its secret Eaton Canyon Project, a round-the-clock operation with dozens of machine shops, storage rooms and administration buildings spread over 146 acres in the foothills.

Workers in Eaton Canyon loaded fuel into more than 1 million rockets before the war's end, testing them in the canyons. Unknown to the locals—who heard the curious boom of test firings—Caltech-designed rockets led shore assaults in Sicily, Guam and Iwo Jima, blew up German submarines and ex-



KIM HAGGERTY / For The Times

'We were so close to the [action], we could see the

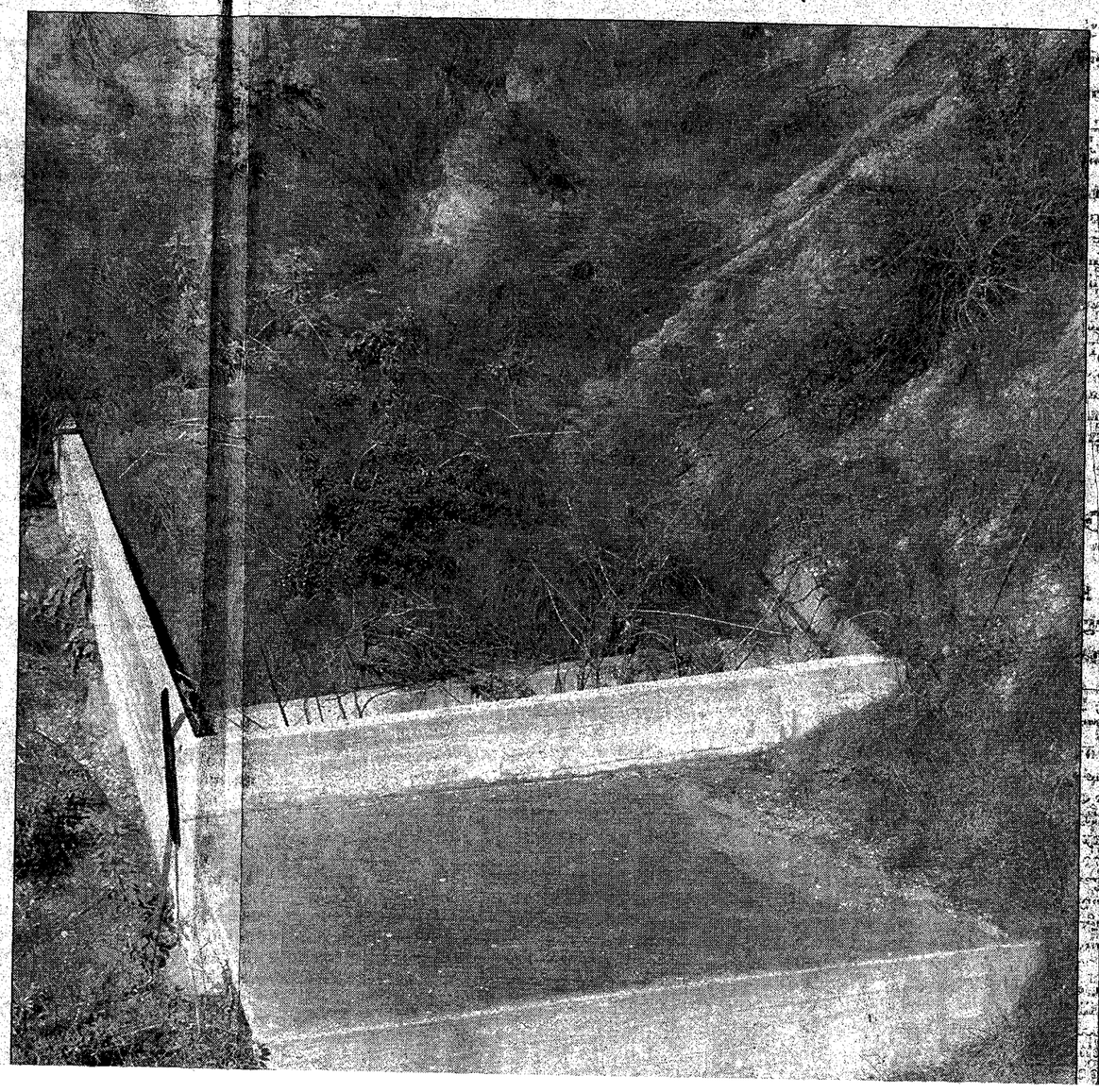
where the foothills above Eaton Canyon can be seen, such as Mac David's back yard.

The bunkers are a few hundred yards from a cul-de-sac, up a sandy trail, where bits of an asphalt road remain. The bunkers' 15-foot-high walls—reinforced concrete, a foot thick—are intact, the lightweight wood-and-tar-paper roofs long gone. The metal doors are no longer standing, although a couple remain on the ground, their hinges gone.

Inside the bunkers, tall grass grows atop mounds of dirt and sunshine throws shadows on graffiti-scarred walls. Also on the walls are spray-painted drawings of huge green daisies next to a peace sign—perhaps an unintentional commentary on the war effort that once took place there.

In one bunker, a faded orange couch with no legs sits next to a dirty sleeping bag. Homeless people saw the bunkers as a place to sleep after the wildfire, neighbors said. Mac David saw something else.

He remembers the first time he hiked into the foothills, a few days before the wildfire. He went up after a local fire captain told him the bunkers were still up there. At that time, he had only a notion that he wanted to write something about Caltech's contribution to



ploded Japanese aircraft.

The bunkers are the only buildings left in the foothills from the $80-million project, which produced the first artillery rockets ever used by the U.S. military.

At the time, Pasadena was the rocket-making capital of the country, said Caltech archivist Judith Goodstein, with enough explosives in Eaton Canyon to blow the city off the map.

Even now, few people know about Caltech's war work, said Altadena resident Kenton Mac David, who worked on the project for two years as a technician.

Mac David, 72, is using his own time and money to write a "modest historical paper" on the project, for free distribution to local libraries and historical societies. He wants to interview not the scientists or administrators but the amateur laborers with whom he worked—the homemakers, barbers, preachers. The project's staff included dozens of Caltech's top scientists and more than 3,000 workers.

"A lot of this has been forgotten," said Mac David. "Now there's a generation of people who have never heard of the [project]. I just think it's part of history."

The newly exposed bunkers are stirring curiosity about just what *was* going on in those hills during the war, when armed guards stood watch over the canyons. The revived interest comes during a year of 50th-anniversary commemorations of World War II milestones. On March 14, at Iwo Jima, veterans will commemorate the famous island battle against Japanese defenders. On Feb. 19, 1945, Marines, supported by Navy units, landed on Iwo Jima under cover of 20,000 Caltech rockets.

Now, in unincorporated Kinneloa Estates, where the bunkers are exposed, neighbors whisper that the structures had *something* to do with a secret project during the war.

"I heard some neighbors talk that [Caltech] stored ammunition there during World War II," said resident Charles Brinton, 78, who said he had only recently heard of the Eaton Canyon Project.

No rocket fuel remains in or near the empty bunkers. Two of the structures are inaccessible, nearly buried by hillside erosion and chaparral growing on top. The three others are visible in the Kinneloa Estates area and other areas after the wildfire.

things we were inventing and making were being used against the enemy in a matter of days and weeks.'

CONWAY W. SNYDER
Rocket project official

But 50 years ago, the place was buzzing.

The project kicked off in September, 1941. Workers parked at a guard station on what is now Kinneloa Canyon Road. The project's boundaries were marked off by concrete barricades.

Three shifts worked 24 hours a day, making parts to ignite the rockets, running tests on rocket fuel and filling powder bags to ignite the propellant. Workers wore white fireproof coveralls and steel-toed shoes with brass-nailed soles to ward off any static sparks.

Kinneloa Estates resident Lee T. Carmichael, 78, was the foreman in charge of the project's mechanical equipment and crew from 1941 to 1946. He remembers pulling 36-hour shifts in the rush to make rocket parts, with much of his crew showing up at his house afterward for breakfast.

Mac David ran a firing station. He strapped down rockets on blocks and then fired them, checking pressure, temperature and other indicators. On some days, rockets boomed every 15 minutes, shooting flames into the air.

Caltech subcontracted with 300 shops in the Los Angeles area to make rocket parts, such as nozzles and firing plugs. Eventually the parts were assembled in Eaton Canyon or local warehouses.

Holy Moses, an aircraft rocket, rolled off the production line in east Pasadena near what is now a Fedco store, Goodstein said in an interview.

Canyon Country resident Conway W. Snyder, 77, named and helped develop the Holy Moses rocket. At the time he was a graduate student in nuclear physics but worked his way up to become the fourth-ranking official on the project.

"We were so close to the [action], we could see the things we were inventing and making were being used against the enemy in a matter of days and weeks," said Snyder, who retired from the Jet Propulsion Laboratory in 1984.

At the war's end, all operations in Eaton Canyon moved to the China Lake Naval Weapons Center near Death Valley. And then Caltech folded up its war operations and returned to academics.

In the Eaton Canyon foothills, all is quiet now, with only the occasional sound of hammering and sawing in the neighborhoods below, signs that life goes on

There is no possibility that the area was contaminated by any leaking fuel or toxic waste, Tibbet said. The project's environmental reports included extensive soil and geology tests on the land.

"All those bunkers were treated like a laboratory—super clean," he said.

The bunkers' imminent demise lends a sense of urgency to Mac David's research.

"That makes it even more interesting to do something on them now, before they tear them down," said Mac David. "To me, it's historical, but things like that [eventually] have to go. Everything gives way to progress."

Mac David retired from the Jet Propulsion Laboratory as an engineering associate in 1986. He plans to write the paper by the end of the year. He is using the few resources available on the project, such as documents from Caltech's archives, and is trying to jar his own memory from his days in Eaton Canyon, from 1943 to 1945.

Meanwhile, the bunkers stand out in the naked hills, like lone sentries of a forgotten time. No local historical societies or libraries have any information about them, Mac David said.

"It's like these . . . years were lost," he lamented, shaking his head in frustration.

At one time, Caltech owned scores of storage bunkers and other support buildings throughout the foothills, but most were razed for residential development in Kinneloa Mesa and Kinneloa Estates, where houses started popping up in the 1960s. The remaining bunkers sit on land owned by Kinclair Partnership in Rowland Heights, said Bert Tibbet, the partnership's project coordinator. Environmental impact reports, approved by the county in the early 1990s, determined that the bunkers have no historical significance and can be razed when the partnership begins work on its approved 20-home subdivision, he said. No groundbreaking date has been set.

Maybe not for long.

once he saw the bunkers, he decided to focus on workers in the Eaton Canyon Project.

"When I saw what was left, I thought, 'This is fantastic, man! This is part of history,'" Mac David said.

HYUNGWON KANG / Los Angeles Times

One of five storage bunkers still standing in Eaton Canyon is nearly buried by years of erosion in foothills above Pasadena.

How Caltech Launched the U.S. Rocket Revolution

Caltech's rocket weapons broke new ground in the field of artillery for U.S. forces.

The U.S. military had never used rockets before. U.S. forces preferred cannons, which were more accurate. Yet they wanted powerful projectiles that would have more impact and range.

The British had used artillery rockets in 1814, and the Germans and Russians had modern versions under development. U.S. forces wanted to catch up.

According to archivist Judith Goodstein's book on the history of Caltech, "Millikan's School," and a spring, 1991, article in Caltech's Engineering & Science magazine by Conway W. Snyder, who worked on the Eaton Canyon Project, the transition to rockets went like this:

At the government's request, Caltech set out to make rockets.

The problem was finding the right form of propellant powder, or rocket fuel. Past efforts had involved a long, painstaking process that yielded grains of powder that were too small. Small grains would sharply limit the range and velocity of the rockets they propelled.

Caltech scientists came up with a process to produce larger grains, using a propellant called ballistite, which was also used in mortar shells.

Ballistite looks like soft black sheets of plastic. The sheets were put into a press designed to extrude the proper-sized grains.

Other rocket research and development was performed elsewhere in the United States, but most of the technology came out of Caltech.

Meanwhile, the Germans and Russians had successfully developed their own rockets. But one U.S. military officer characterized the Holy Moses rockets—dropped from aircraft—as the "best antitank weapon of the war."

Today's air-to-air guided missiles are direct descendants of the first aircraft rockets developed at Caltech.

—RENEE TAWA